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LICE (PHTHIRAPTERA: AMBLYCERA, ISCHNOCERA) OF RAPTORS IN HUNGARIAN ZOOS AND REHABILITATION CENTERS

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Here, I describe louse (Phthiraptera: Amblycera, Ischnocera) infestations of raptors kept in zoos and rehabilitation centers in Hungary and conclude that injuries increase the frequency and extent of such infestations. Fifty-five individuals of 18 species of raptors from the families Accipitridae, Falconidae, Tytonidae, and Strigidae were examined in 1995–96 at the Zoological Parks of Győr and Veszprém (14 and 12 birds, respectively), the raptor rehabilitation center of Fertõ-Hanság National Park at Kõszeg (11 birds), and the rehabilitation center of Hortobágy National Park at Góréstanya (18 birds). There was no regular use of insecticides to control louse infestations at any of these sites. Many of the raptors were badly injured by electrocution from high voltage transmission lines or by illegal shooting. Injuries often resulted in extensive damage to wings and legs.

Lice were collected using forceps during 10-min visual examinations while the birds were immobilized by assistants. Twenty birds (36%) were found to carry lice resulting in a total of 373 lice (86 males, 196 females, and 91 nymphs, Table 1) collected. Eight species of lice were found, two of which were typical parasites of galliform hosts and presumably originated from dead chickens supplied as food.

Avian grooming partially serves to control the spread of ectoparasites (Marshall 1981). Grooming, such as foot scratching, eliminates lice on the head and bill preening removes lice from other body parts (Clayton 1991, Rózsa 1993). Since I assumed that birds with major limb injuries were presumed to preen less frequently, I compared the numbers of lice on 11 injured and 28 healthy raptors. Because of the aggregated distribution of lice on different individuals (Rékási et al. 1997), I used a one-tailed Mann-Whitney U-test as a nonparametric statistic. Statistical analyses were carried out by InStat 2.01.

Avian lice can be viewed as representatives of a single ecological guild of ectoparasites. Thus, their abundance can be expressed as total louse numbers (belonging to any species) living on the same individual bird (Rózsa 1997). When comparisons were made between raptors with damaged limbs versus intact limbs, there was a significant difference in total louse abundance ($U = 48.5$, $P < 0.001$, Fig. 1). Lice also show considerable site-specificity on their hosts (e.g., Perez et al. 1996); therefore different louse taxa should show different responses to decreased grooming abilities of injured raptors. Species of the genus *Craspedorrhynchus,* for instance, are typically distributed on the head and nape of raptors and birds scratch using their feet to remove them (Gallego et al 1987). Limb-damaged birds naturally show much less foot scratching, either because they lack the use of one leg which prohibits them from reaching their heads with the other one, or because they have broken wings which distorts normal foot scratching movements at least on one side of the body. In fact, the abundance of *Craspe-*

Table 1. Lice collected from healthy and injured raptors in Hungarian zoos and rehabilitation centers.

RAPTOR SPECIES	NO. HEALTHY BIRDS	NO. INJURED BIRDS	LOUSE SPECIES	NO. FROM HEALTHY BIRDS	NO. FROM INJURED BIRDS
Accipiter gentilis	1	1	*Menopon gallinae*[a]	0	2
Buteo buteo	11	6	*Craspedorrhynchus platystomus*	8	102
			Colpocephalum buteonis	0	31
			Degeeriella fulva	7	35
			Menopon gallinae[a]	0	4
			Lipeurus caponis[a]	0	1
Buteo rufinus	1	0	*Craspedorrhynchus platystomus*	8	0
			Degeeriella fulva	20	0
Circus aeruginosus	3	0	—	0	0
Circaetus gallicus	1	0	—	0	0
Falco peregrinus	1	0	—	0	0
Falco subbuteo	0	1	—	0	0
Falco tinnunculus	8	1	*Degeeriella rufa*	40	27
Aquila heliaca	0	1	*Degeeriella fulva*	0	2
Aquila pomarina	0	1	*Craspedorrhynchus naevius*	0	73
Hieraetus pennatus	1	0	*Degeeriella fulva*	12	0
Theratopius ecaudatus	1	0	—	0	0
Asio otus	2	0	—	0	0
Athene noctua	4	0	—	0	0
Bubo bubo	1	0	—	0	0
Nyctea scandiaca	2	0	—	0	0
Stryx aluco	2	0	—	0	0
Tyto alba	5	0	*Kurodaia subpachygaster*	1	0

[a] Lice specific to galliforms.

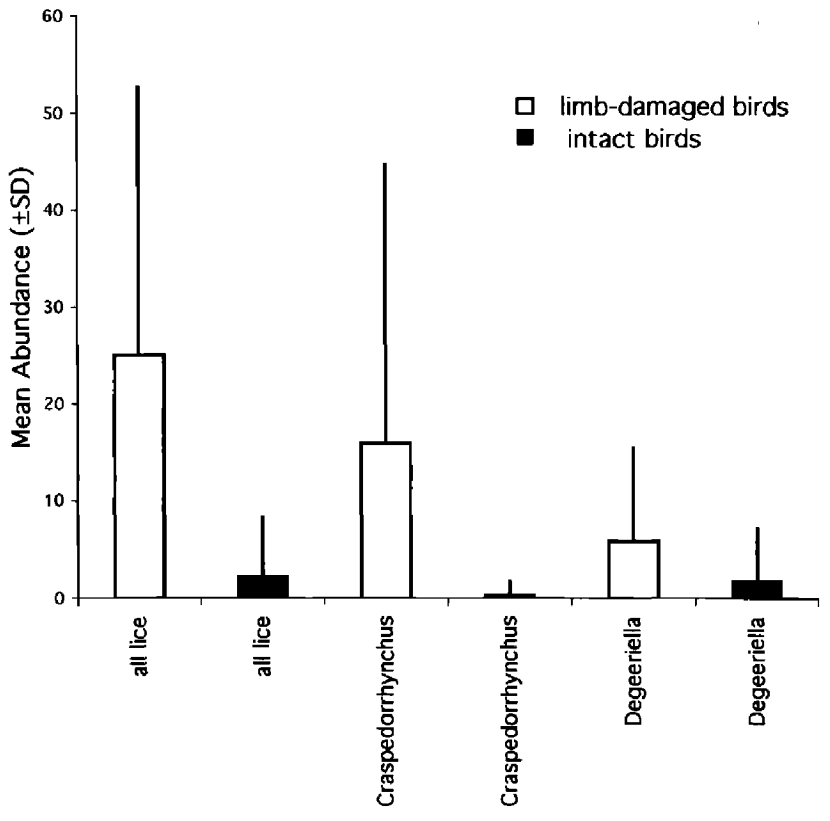

Figure 1. Mean number (±SD) of all lice and only lice belonging to the genera *Craspedorrhynchus* and *Degeeriella* on limb-damaged (11 birds) and healthy raptors (28 birds).

dorrhynchus lice was significantly greater in injured versus healthy raptors ($U = 101.5$, $P < 0.05$).

Contrastingly, lice of the genus *Degeeriella* are typically distributed on the wings, especially the primary and secondary feathers. Raptors typically preen with their beaks to eliminate them (Clay 1958). Limb-damaged birds usually exhibit normal preening activities except for preening of broken wings. *Degeeriella* lice appeared to be more abundant on limb-damaged raptors in my examination, though this difference was not significant ($U = 119.5$, $P > 0.10$).

The correlation between major injuries of raptor limbs and increased louse infestations seemed to be related to the impairment of their grooming behavior. Site-specific lice such as those that infest the heads of raptors were found to be common. Since wing- or leg-damaged raptors are at times important for raptor breeding and repatriation programs, it is important that they be routinely examined for ectoparasite infestations and may need special attention to control their lice.

RESUMEN.—Cincuenta y cinco individuos de 18 especies de aves rapaces fueron examinados con el fin de encontrar infestaciones de piojos (Phthiraptera: Amblycera, Ischnocera) en Hungría en 1995 y 1996. Un total de 373 piojos de 8 especies fueron encontrados en 20 aves. Los daños mayores causados en alas y patas como electrocutaciones, aparentemente lograron disminuir la habilidad de acicalarse de las aves aumentando la frecuencia de los piojos. Debido a que estas aves fueron mas propensas a ser infestadas por ectoparásitos, especialmente aquellas con problemas en alas y patas, hubo que prestarles mayor atención para el control de piojos.

[Traducción de César Márquez]

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